

Fig. 1A

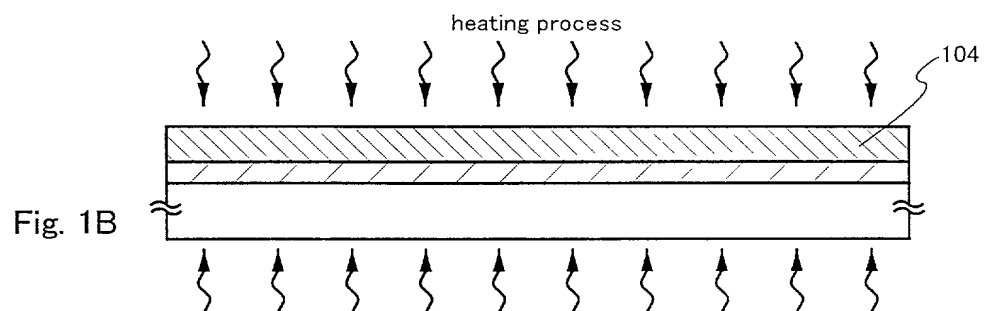


Fig. 1B

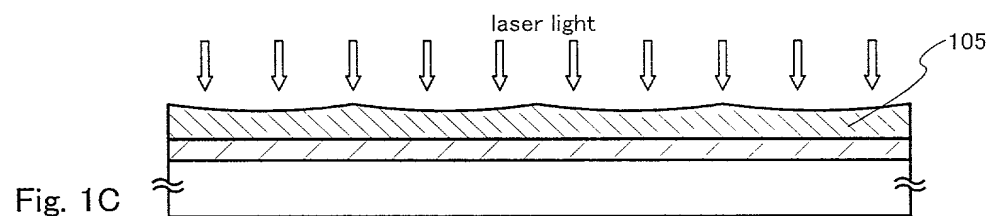


Fig. 1C

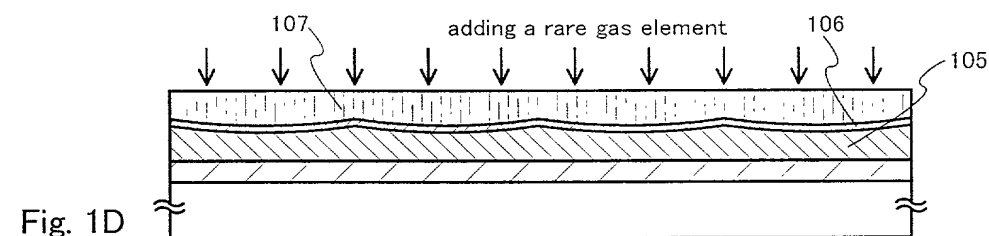


Fig. 1D

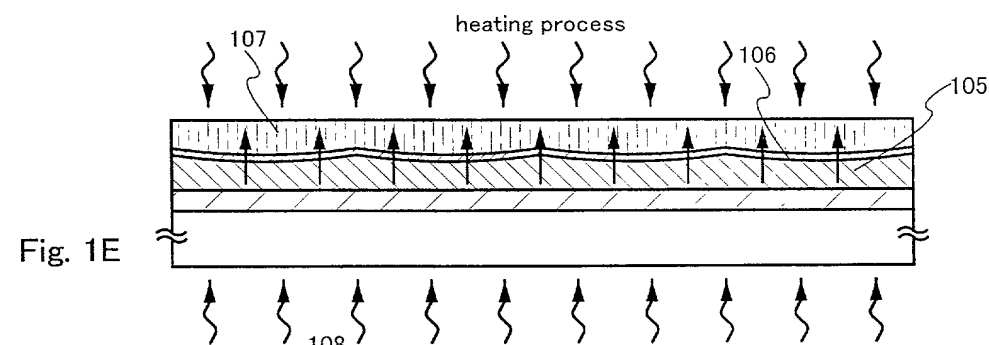


Fig. 1E

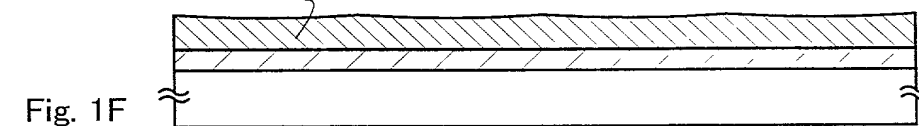


Fig. 1F

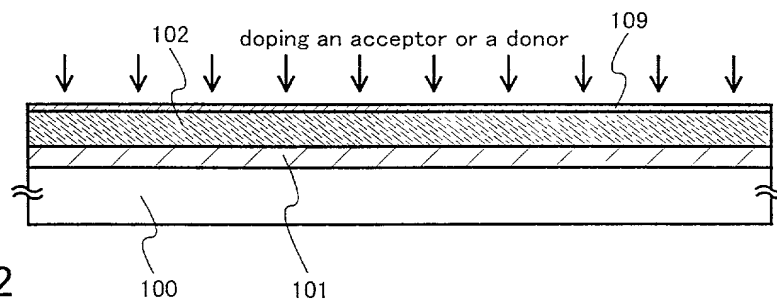


Fig. 2

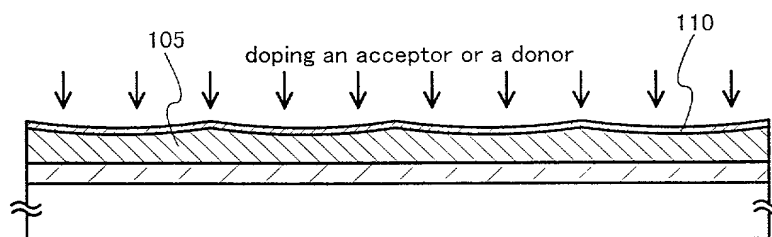


Fig. 3

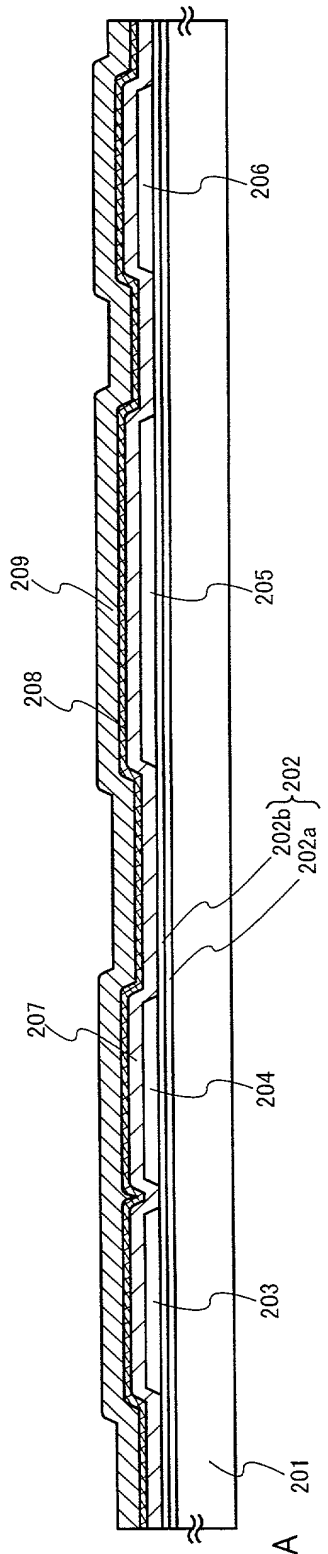


Fig. 4A

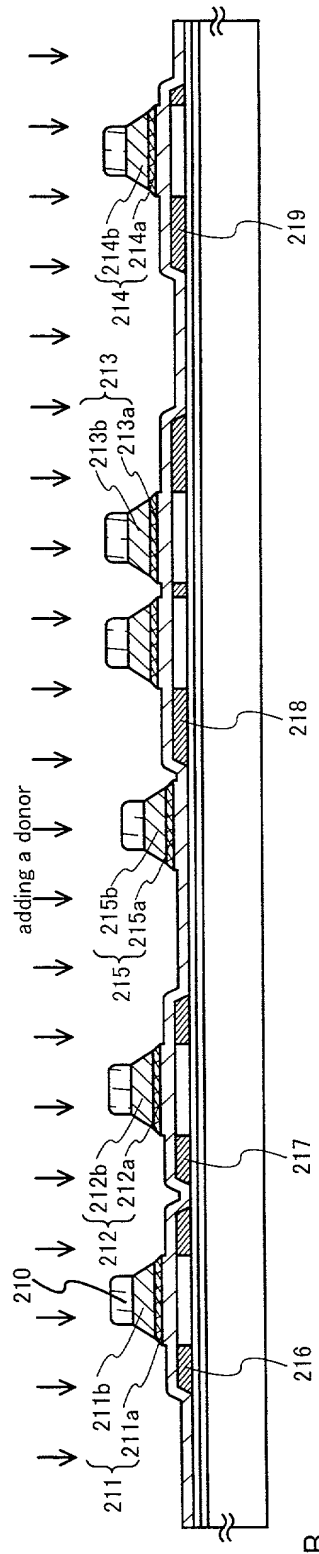


Fig. 4B

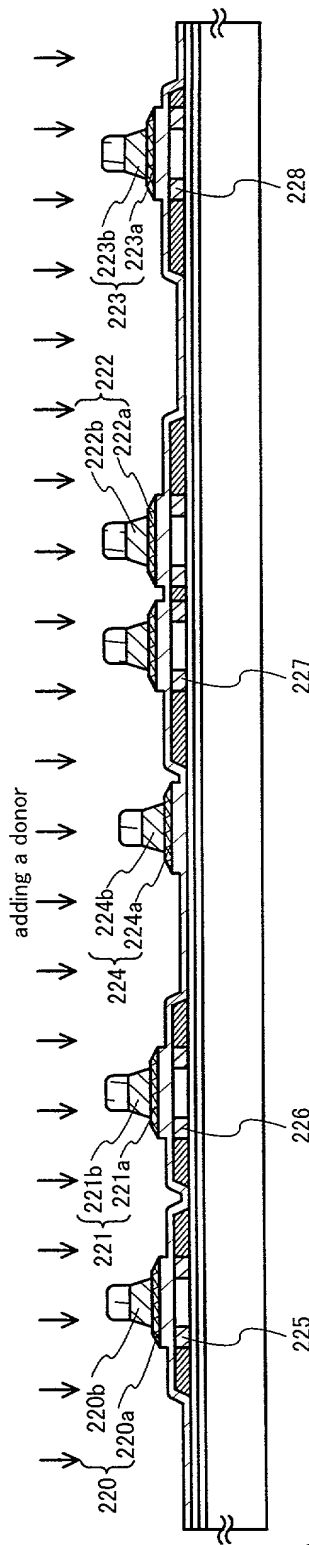


Fig. 5A

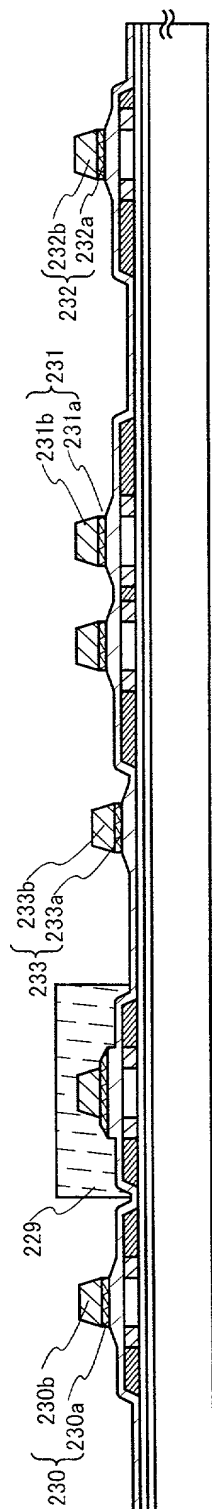


Fig. 5B

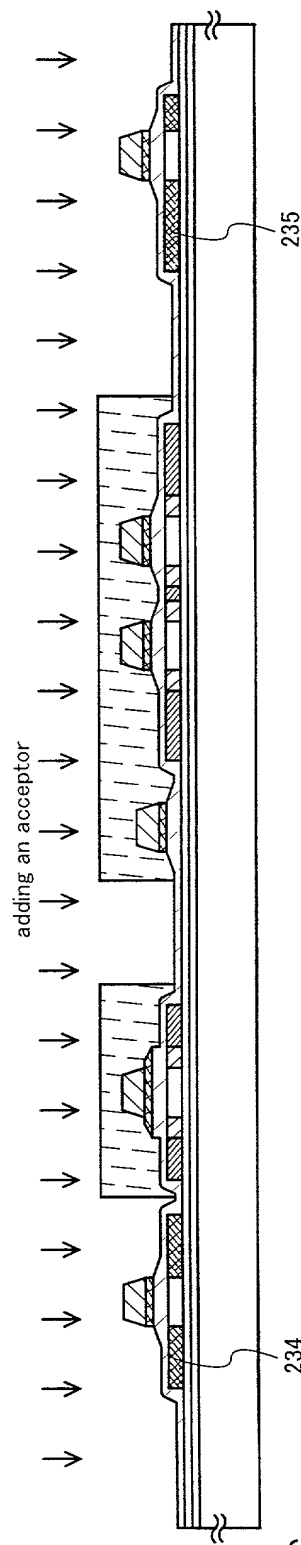


Fig. 5C

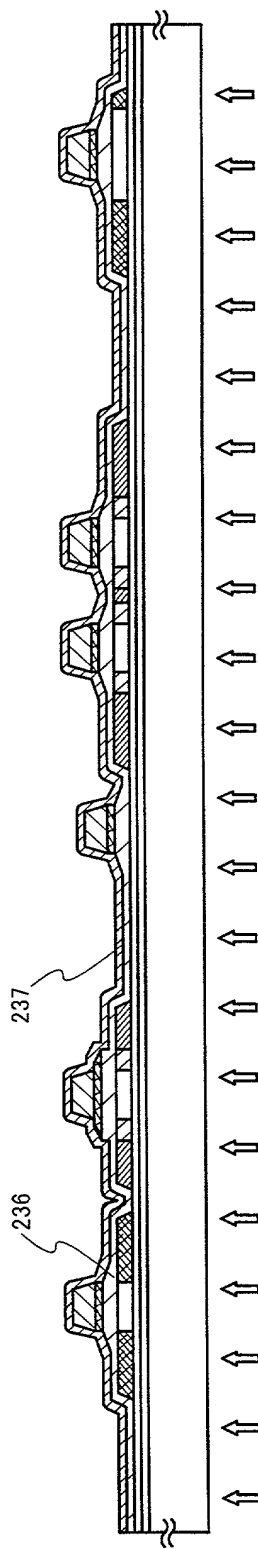


Fig. 6A

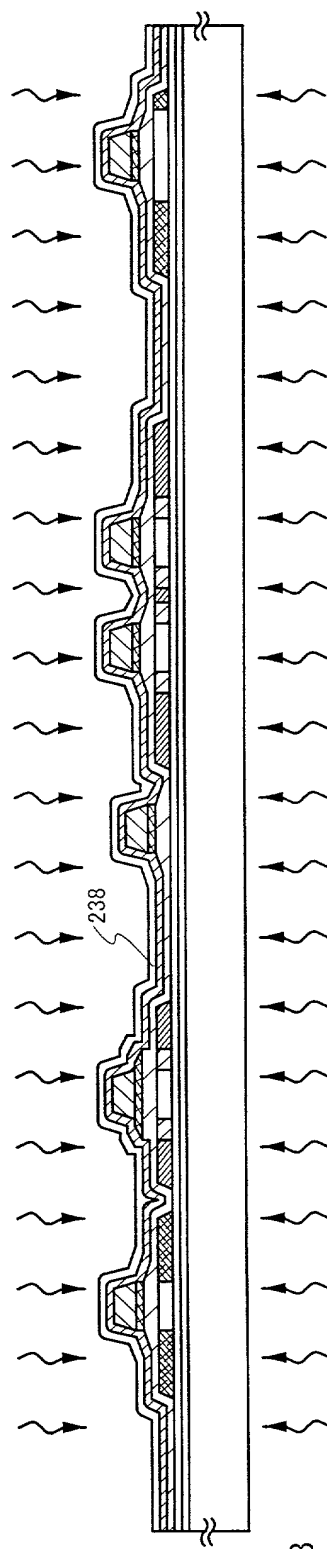


Fig. 6B

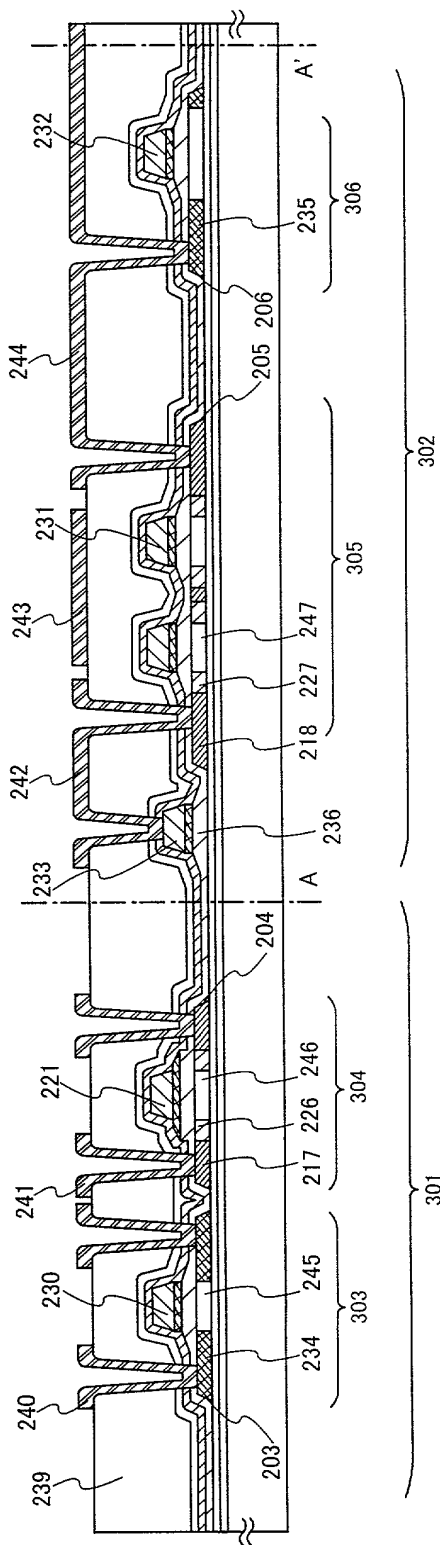


Fig. 7A

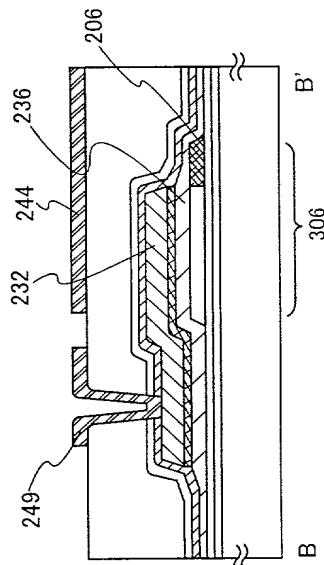


Fig. 7B

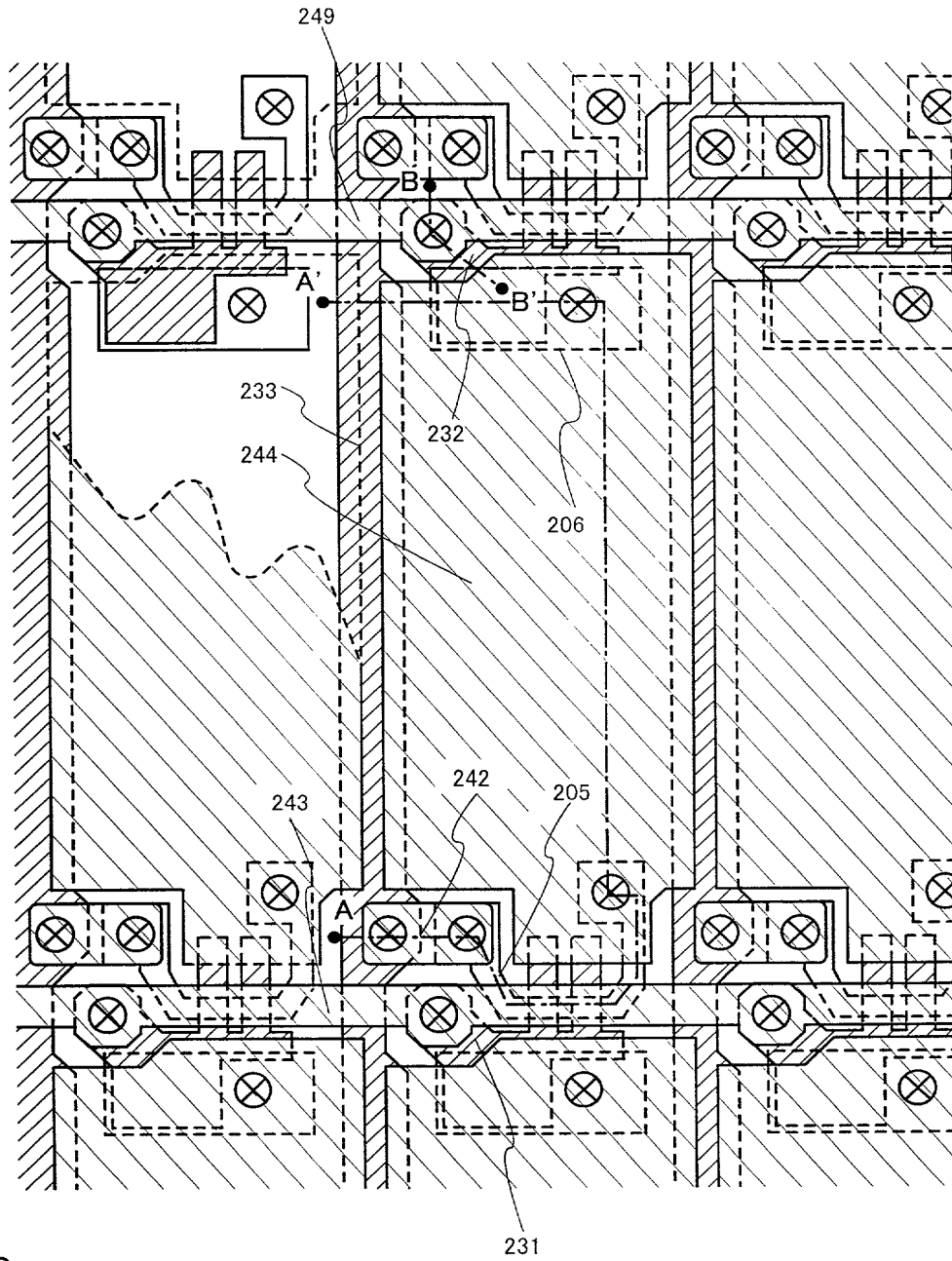


Fig. 8

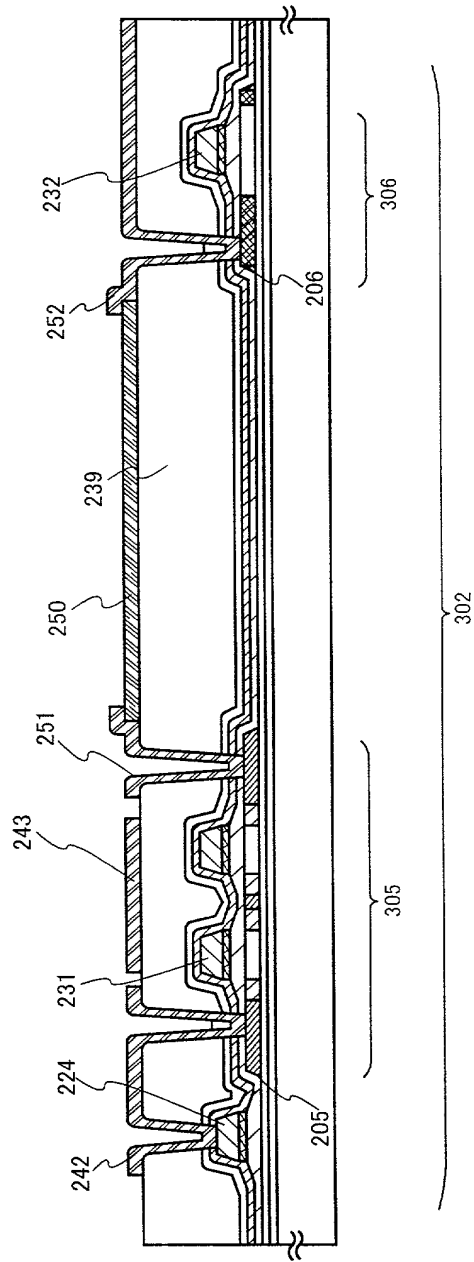


Fig. 9

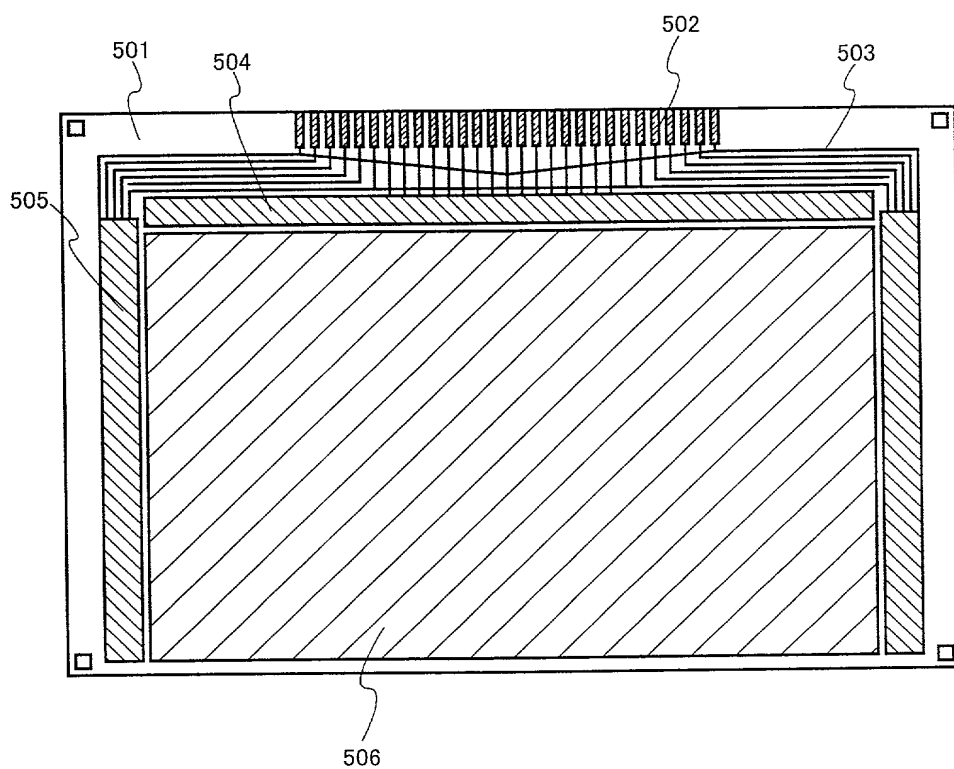


Fig. 10

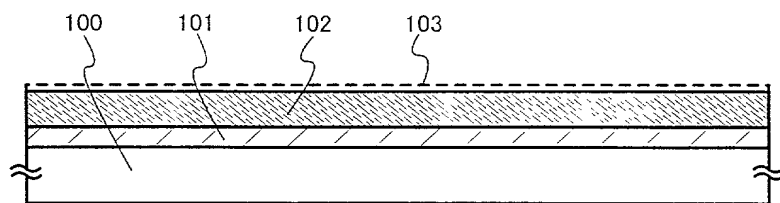


FIG. 11A

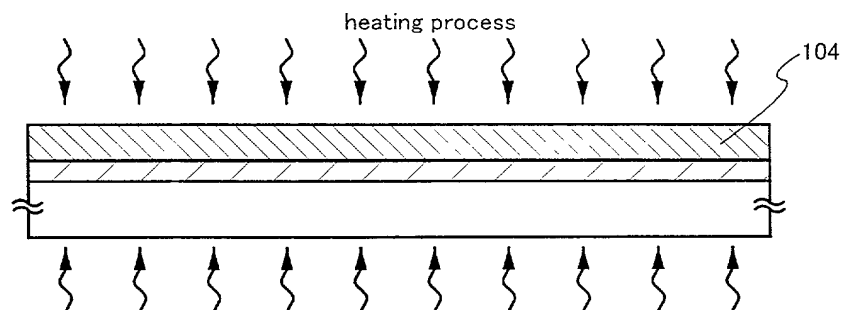


Fig. 11B

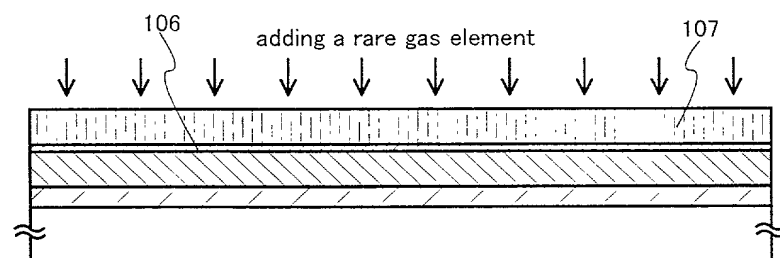


Fig. 11C

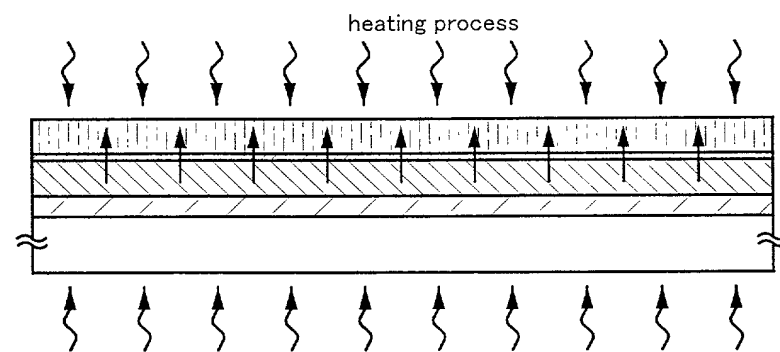


Fig. 11D

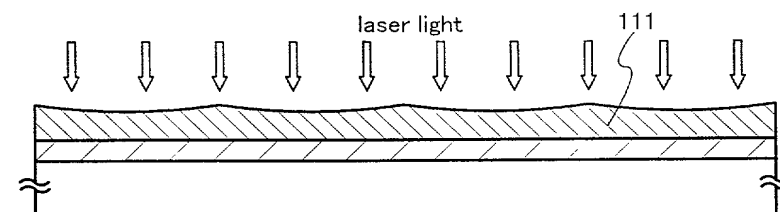


Fig.11E

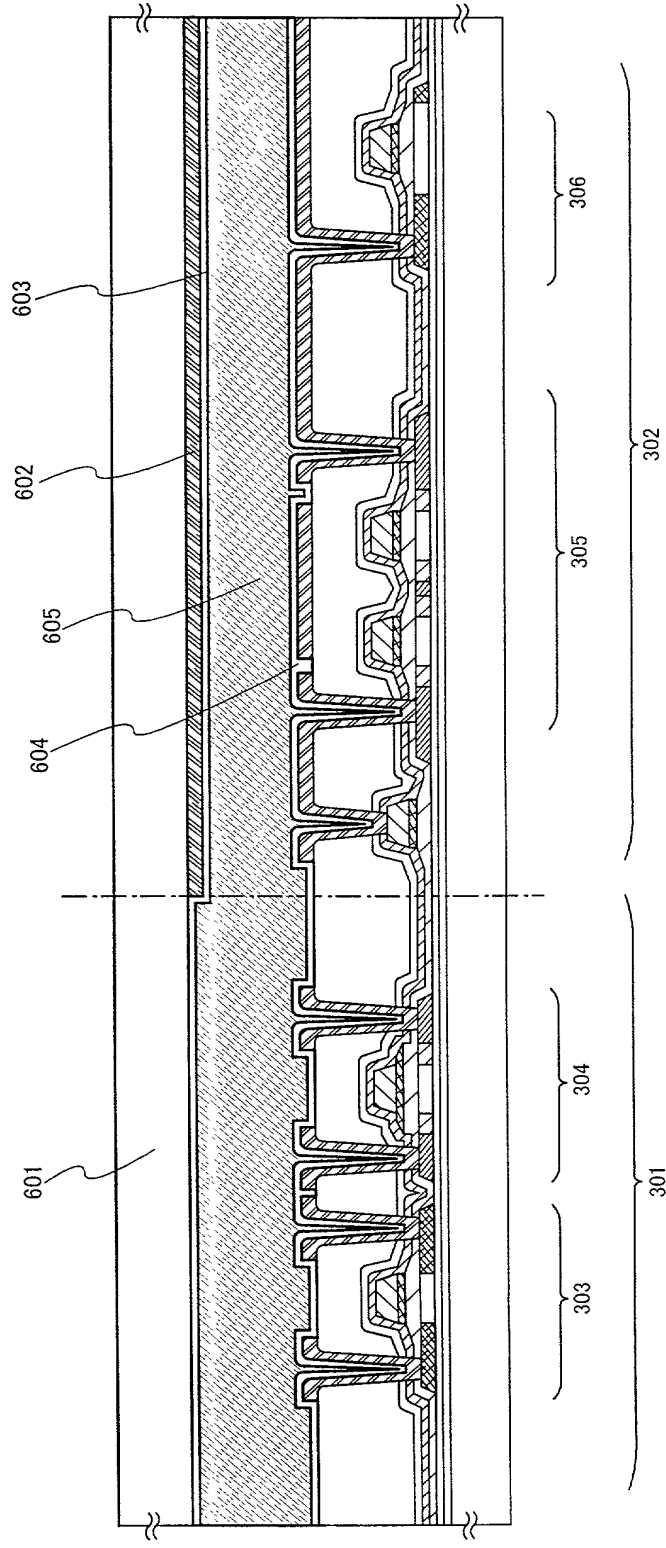


Fig. 12

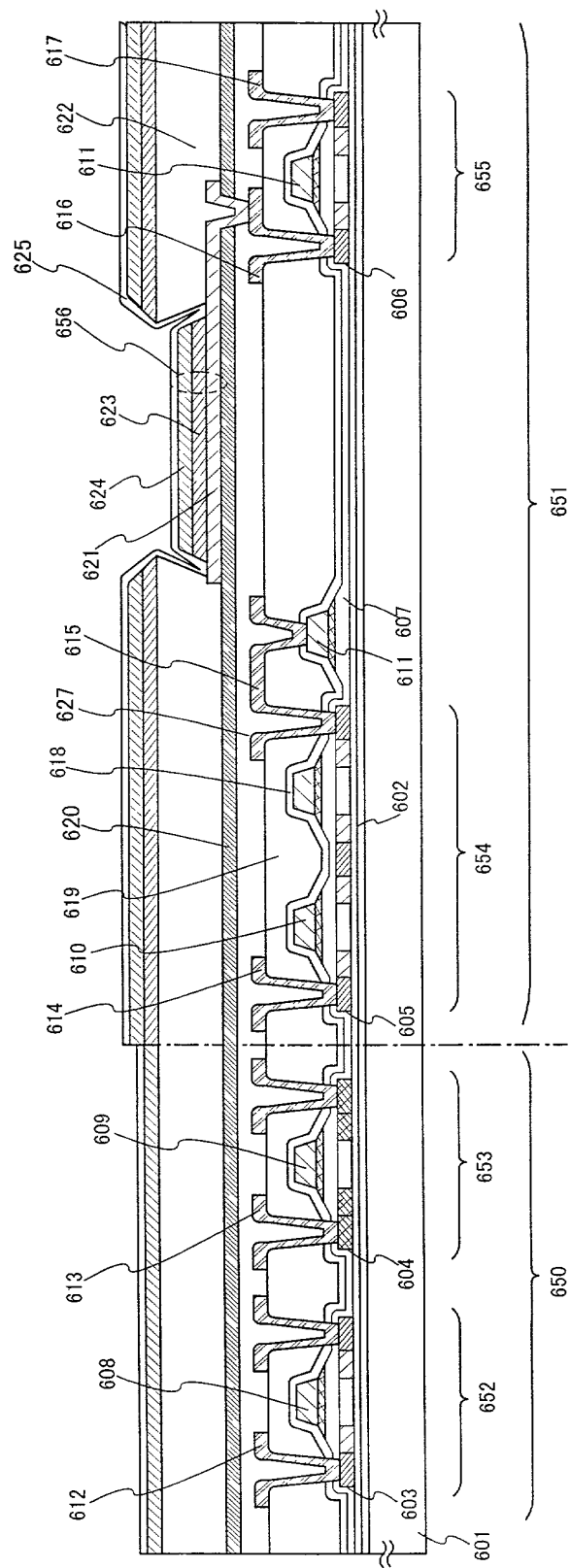


Fig. 13

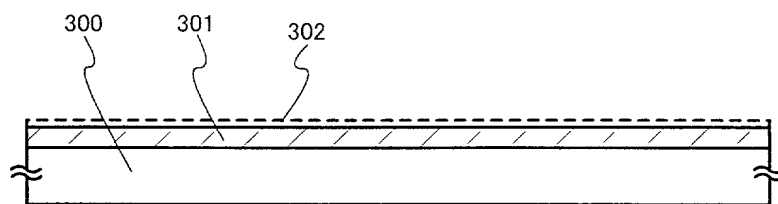


Fig. 14A

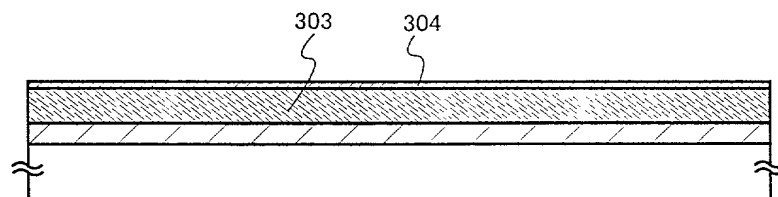


Fig. 14B

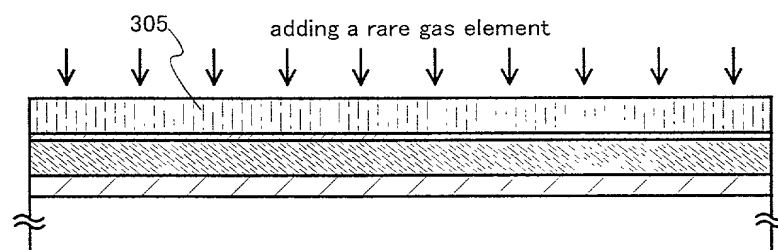


Fig. 14C

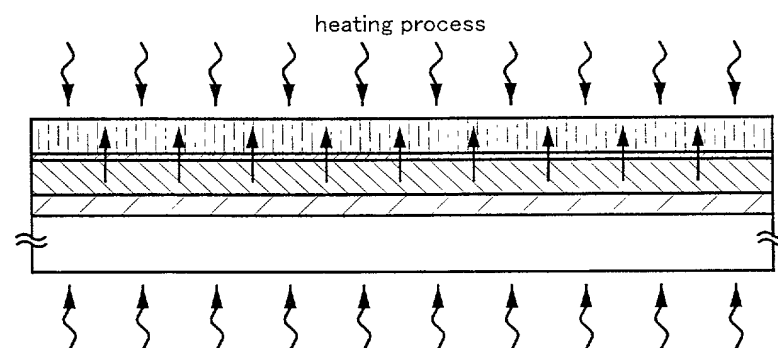


Fig. 14D

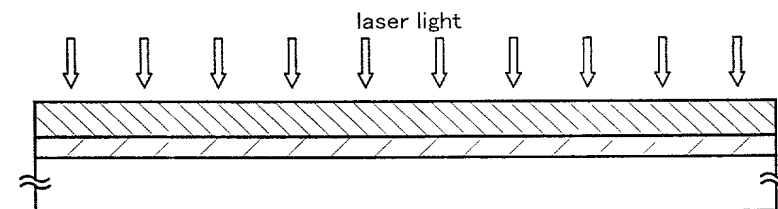


Fig. 14E

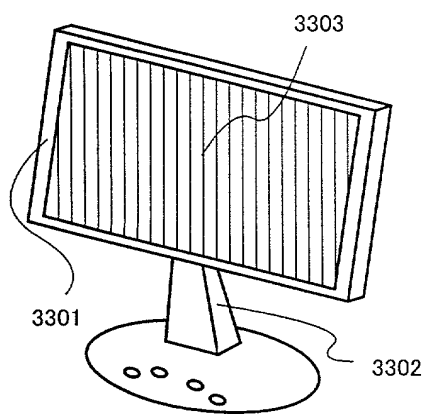


Fig. 15A

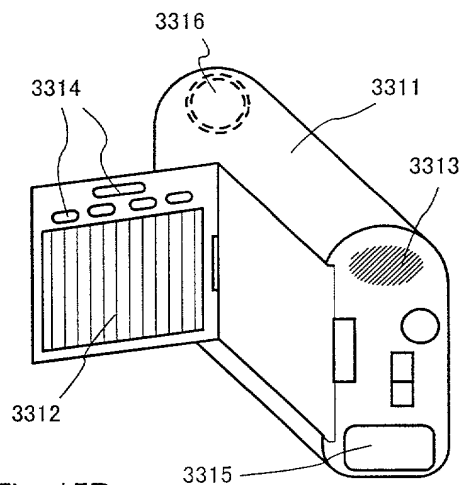


Fig. 15B

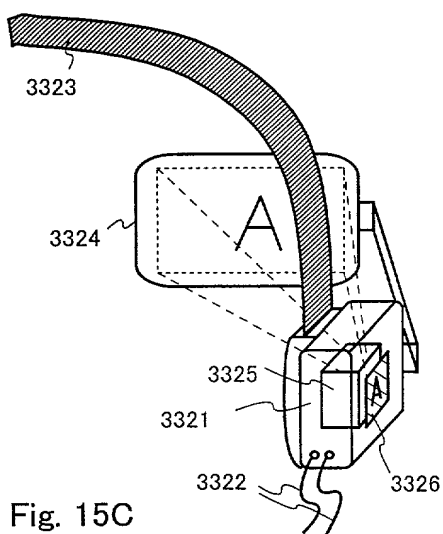


Fig. 15C

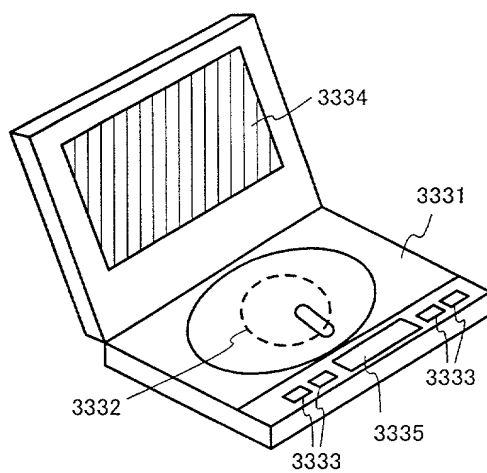


Fig. 15D

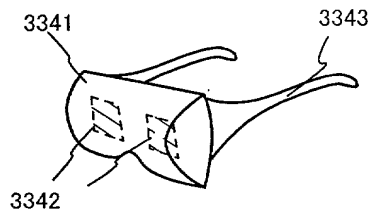


Fig. 15E

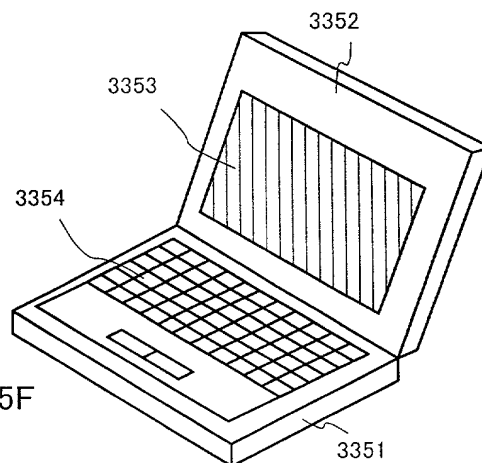


Fig. 15F

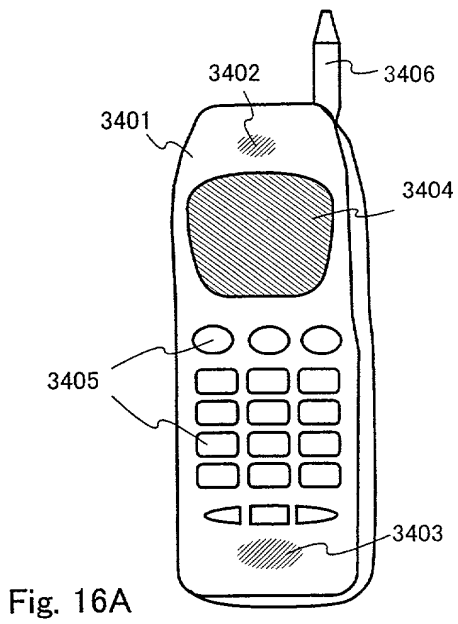


Fig. 16A

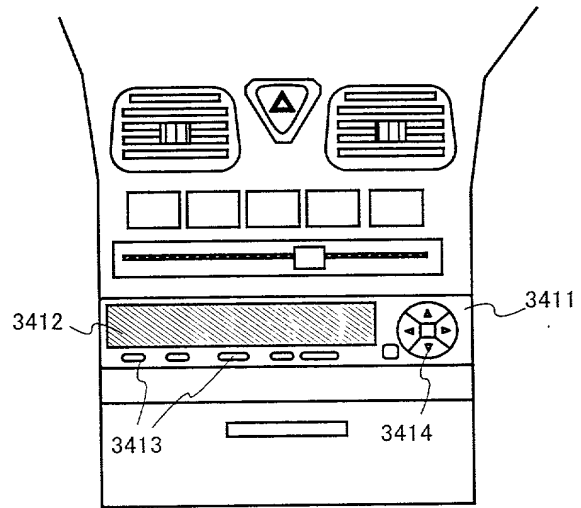


Fig. 16B

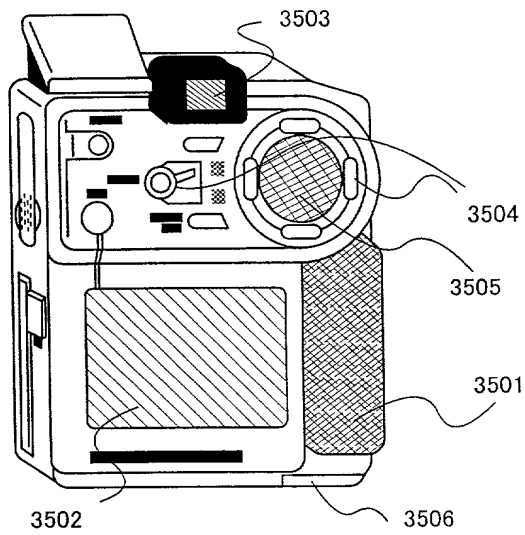


Fig. 16C

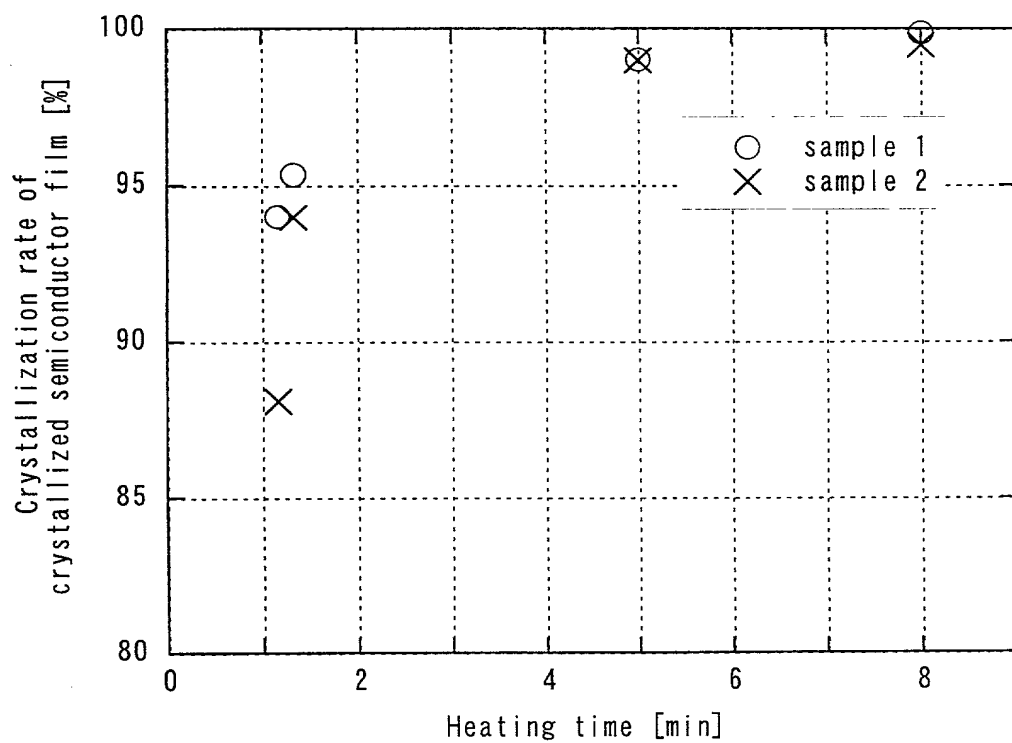


Fig. 17 Relation between heating time and crystallization rate by GRTA method.

Ni concentration added to amorphous silicon film: 10 ppm,
warm-up period to 650°C by GRTA method: 3'30,
observation: optical microscope $\times 1000$ transmission.

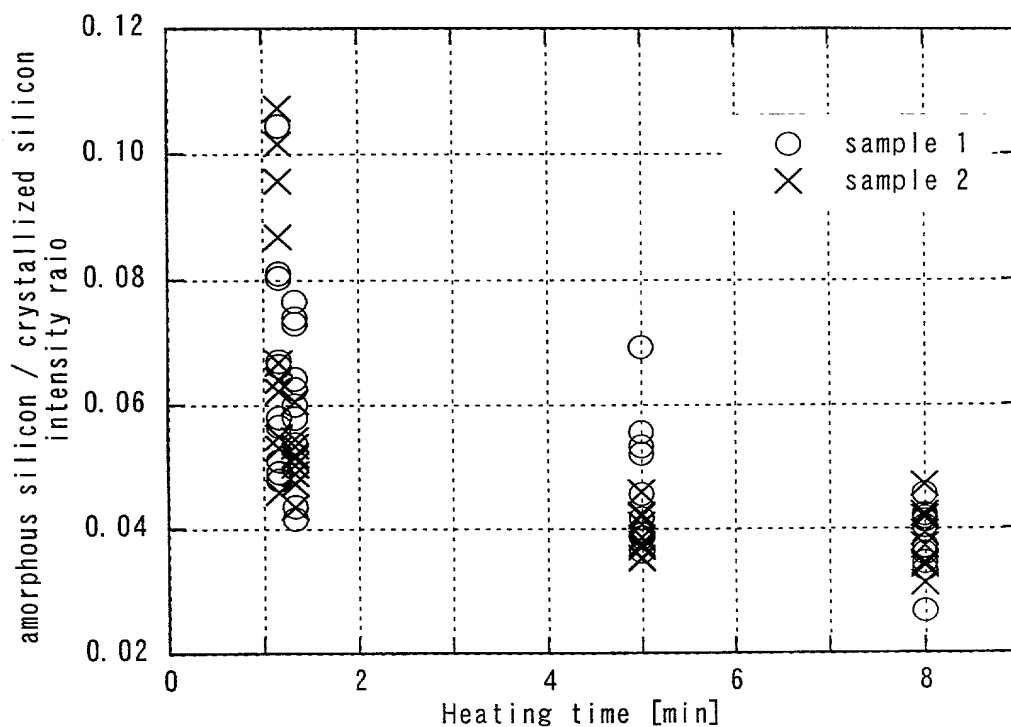


Fig. 18 Heating time dependency of peak intensity ratio of T0 (amorphous silicon: 480 cm^{-1}) and T0 (crystallized silicon: apploxiimately 520 cm^{-1}).

Ni concentration added to amouphous silicon film: 10 ppm,
 warm-up period to 650°C by GRTA method: 3'30,
 observation: optical microscope $\times 1000$ transmission,
 Raman: $\times 500$, 20sec.

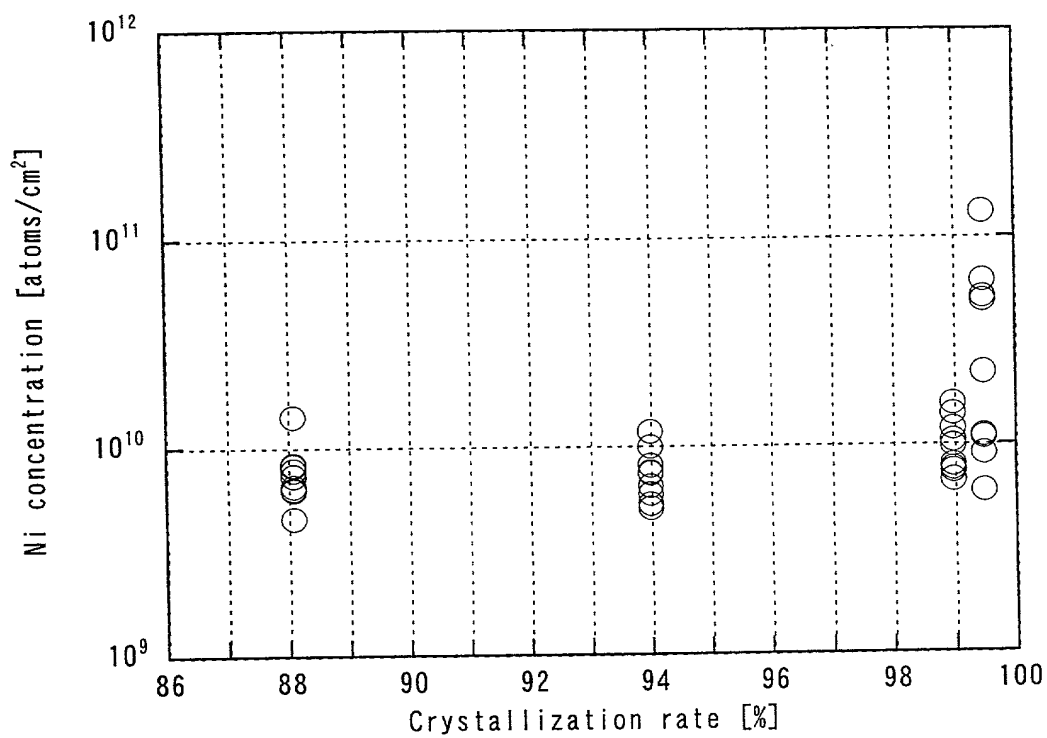


Fig. 19 Relation between crystallization rate and residual nickel concentration (temperature in gettering: 625°C).

Ni concentration added to amorphous silicon film: 10 ppm,
 warm-up period to 625°C by GRTA method: 3'30,
 observation: optical microscope $\times 1000$ transmission,
 gettering site: amorphous silicon film of 500 Å to which
 Ar is added.

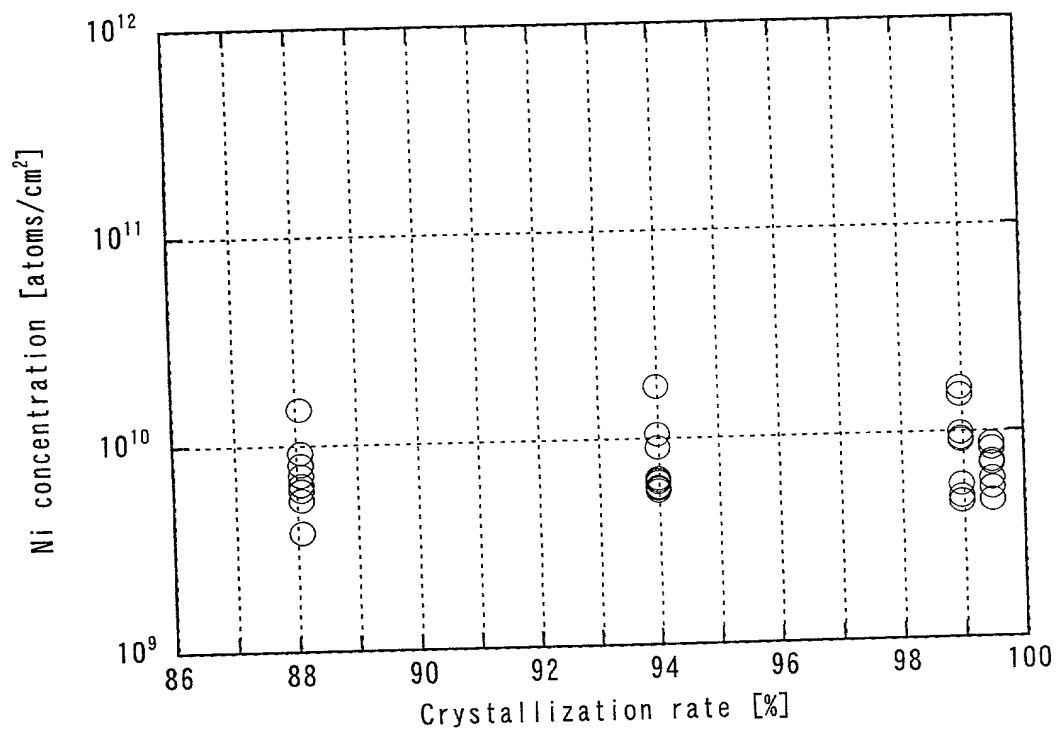


Fig. 20 Relation between crystallization rate and residual nickel concentration (temperature in gettering: 650°C).

Ni concentration added to amorphous silicon film: 10 ppm,
 warm-up period to 650°C by GRTA method: 3'30,
 observation: optical microscope ×1000 transmission,
 gettering site: amorphous silicon of 500 Å to which Ar is
 added.

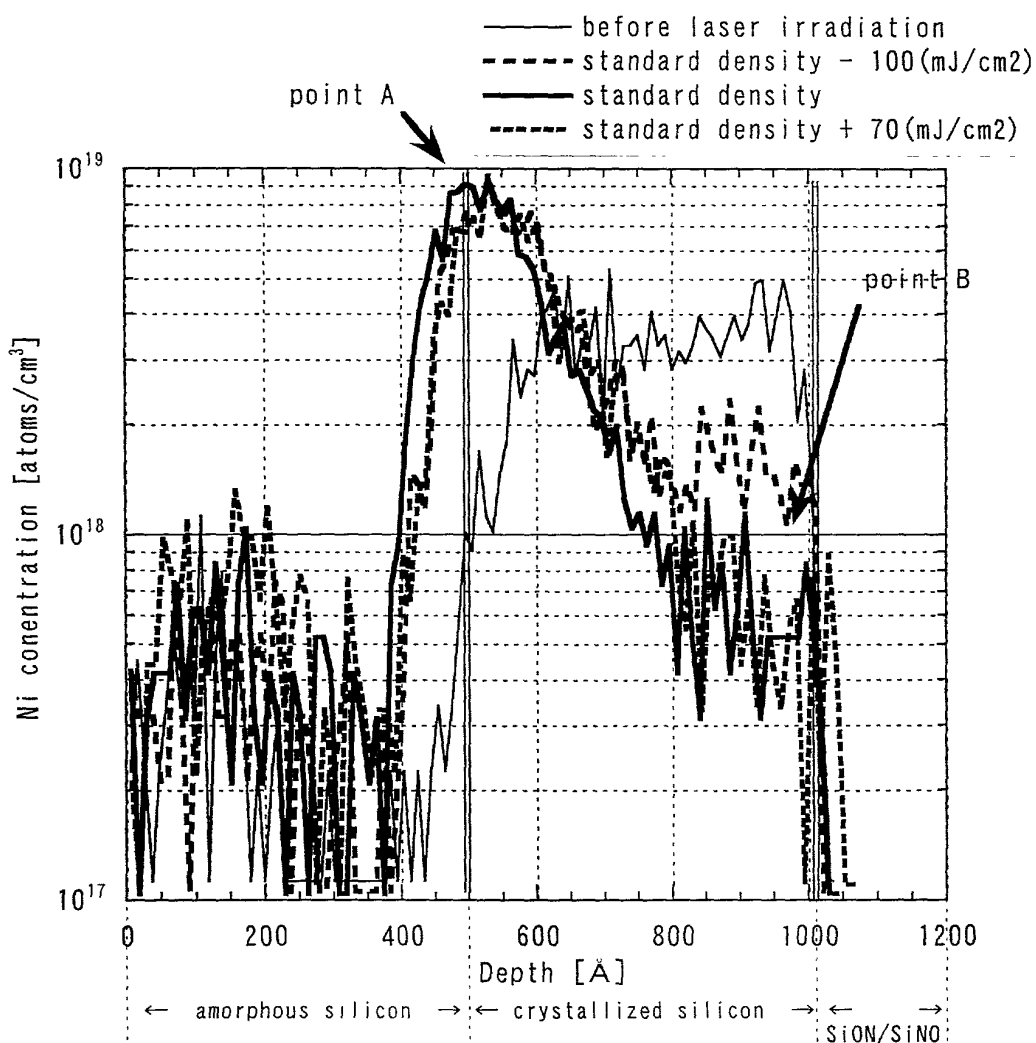


Fig. 21 Ni concentration distribution in semiconductor film by secondary ion composition analysis method.

point A: Ni concentration increases in upper portion of crystallized silicon film as energy density of laser light increases.
 point B: Ni concentration decreases in lower portion of crystallized silicon film as energy density of laser light increases.

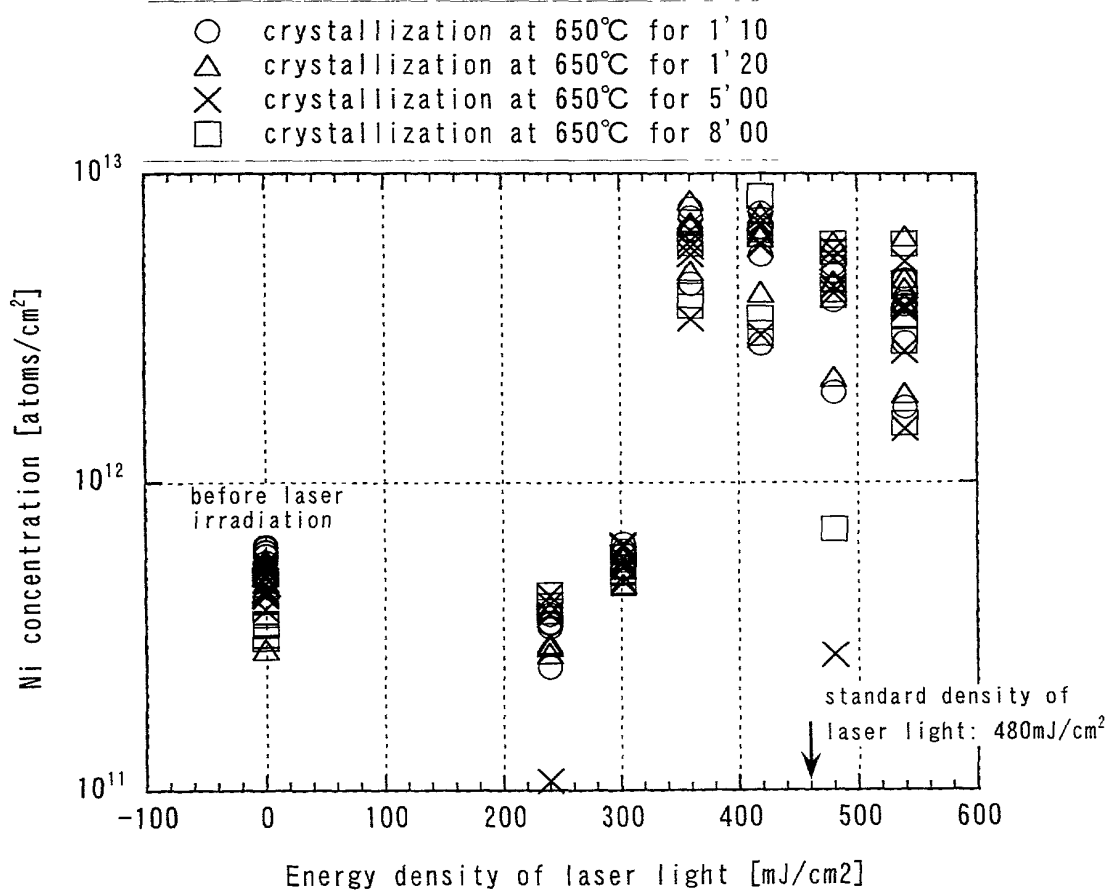


Fig. 22 Energy density dependency of laser light of Ni concentration at a surface of semiconductor film.

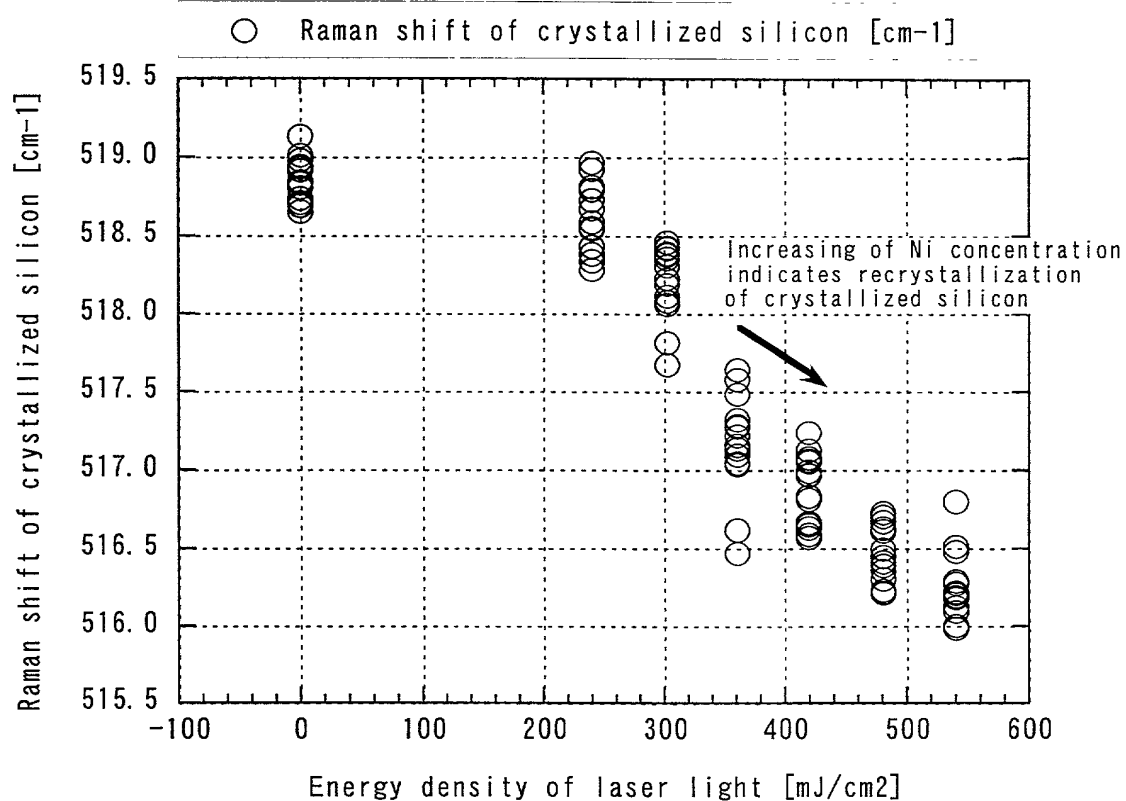


Fig. 23 Energy density dependency of laser light of Raman shift in semiconductor film.

Ni concentration added to amorphous silicon film: 10ppm,
 warm-up period to 650°C: 3'30, heating time: 1'20,
 Raman: $\times 500$, 15sec, 15 points, 5 μ m pitch.

2008210" 5509500T

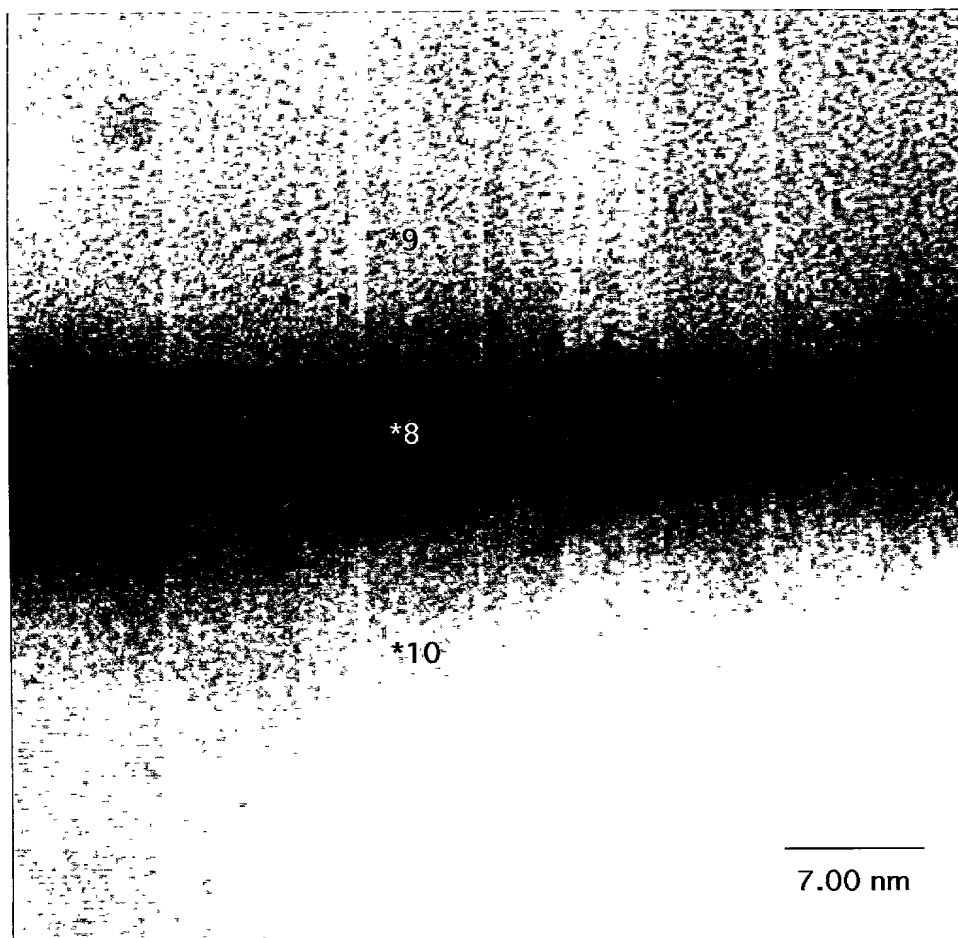


Fig. 24

Fig. 25A

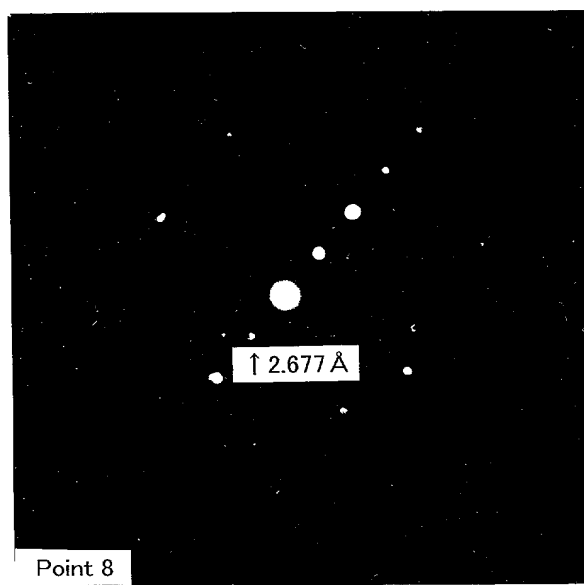


Fig. 25B

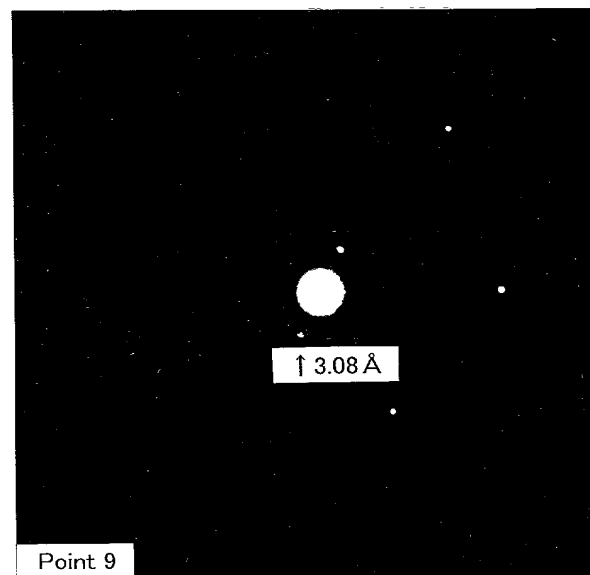
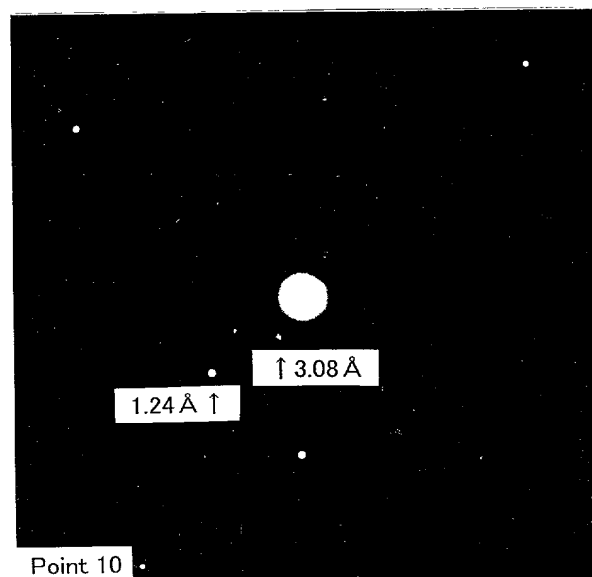


Fig. 25C



accelating voltage: 200kV
(wavelength: 2.51 Å)
camera length: 0.4m (on figure: 0.8m)
beam diameter: approximately 10 Å ϕ

200505-012802

Table. 1
Distance of lattice planes and corresponding crystal orientation.

distance of lattice planes	crystal
2.677 Å	$\text{Ni}_3\text{Si}_2(420) = 2.6637 \text{ Å}$ $\text{Ni}_3\text{Si}_2(330) = 2.700 \text{ Å}$ $\text{Ni}_2\text{Si}(122) = 2.68 \text{ Å}$
3.08 Å	Si(111)
1.24 Å	Si(331)